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Practical Incentives Your Customers Will Value • Energy and Water Savers for the Home

October 6, 2003

Mona Grieser
Abdus. Salam Kamal
Academy for Educational Development
1825 Connecticut Avenue, NW
Washington, DC 20009

RE: Consultation with New Resources Group, Inc., William Wales and Michael Purcell regarding the manufacture of water conservation devices (WSD's) in the country of Jordan.

The following is a diary of people we met and our observations.

Monday September 15:

Meeting #1
The first meeting was with Juma Abu-Hakmeh, Director General of the Amman Chamber of Industry. He was a very nice fellow and obviously a good friend of Abu-Raji (Abdus. Salam Kamal) of WEPIA.

The Chamber of Industry has 7000 members in Amman and 1000 in southern Jordan. They could be a source of information about companies, products and capabilities that are available in Amman. The Chamber of Industry does not provide any financial backing or any tax credits for water conservation or anything else for that matter. When asked personally his opinion of the water, Mr. Abu-Hakmeh said that he thought water quality was good and claimed to have never experienced problems with clogging himself.

He suggested a meeting with the Ministry of Trade.

Meeting #2
Our next meeting was with Rania A. Abdel Khaleq the Director of Water Demand Management for the Ministry of Water. This was a good meeting.

She described some of the problems faced by customers. The PSI is very low and fluctuates between 14-40 psi. The high flow problems are at the lower floors of higher buildings. She indicated that the new standard flow rates are 6 lpm (1.584 gpm) bath, 8 lpm (2.112 gpm) kitchen and 9 lpm (2.376 gpm) for showers.

The typical home has 1 shower, 2 bath sinks and 1 kitchen sink. In their most recent audit the found flow rates to be from 3 to 75 liters per minute. They have 600,000 billing subscribers (meters?).

Ms. Abdel Khaleq described a stepped billing that penalized customers for high water use. Higher rates for high use apply to all of the water used, not just the amount over. Customers are billed every 3 months. The average cost is 5 JD per quarter. The bills are hand delivered and the billing was being privatized to the LIMA Company. Interestingly, she described how customers circumvent the billing penalty for high use by purchasing multiple permits. The permits cost $63JD each which she said was for insurance (?).

Ms Abdel Khaleq indicated that the ministry was running at a deficit. At first she was very cool to the thought of providing WSD's to their customers. She was aware of formulas and thinking that showed how giving away water conservation devices could actually save money in the long run if consider the cost of developing new sources of water and distributing that water. We pointed out that with conservation you could stretch out the days between delivering water which could result in very real immediate savings. She still said that they did not have any money to provide WSD's to their customers. When we mentioned that showerheads could be purchased for as little as $1.00 she changed her attitude.

The bills are hand delivered. We thought that maybe LIMA could bring around the heads and aerators as well. By the end of the meeting she thought that she might be able to promote them through her office. Mona indicated otherwise later.

Meeting #3

We went to the Jordan-United States Business Partnership (JUSABP) which is another USAid sponsored organization. It was created in 1999 and oversees a 16 million dollar fund. They represent different sectors of business with such as: Technology, pharmaceutical, stone and marble, carbonate and ceramics.

We met with Caroline Haddad Ayoub, Maha Shawareb and David Holt. They explained that their role was to promote trade and technology transfer between US and Jordan. IESC of Stamford Connecticut is their home office. They used/use retired U.S. business people to bring skills to Jordan.

They also spoke of the QIZ (Qualified Industrial Zone) and a deal regarding Israeli content which was currently at 8% but trending to 4% to qualify. The Garment Industry represents 40% of the GNP. They discussed possible Free Trade Agreement exemptions.

They knew of the Sayegh Group and indicated that they would do what they could to support their efforts. They said they would not help a start up but might do something with a joint venture.

We discussed a possible follow-up meeting on 9-18.

Meeting #4

We wanted to meet with a plumbing supply store and visited Ataqadom International General Trading Enterprise and spoke with Wael Mahmoud who was the owner's son and a mechanical engineer. He appeared to be managing the operation. It was a very interesting meeting.

They had zillions of water filters for sale and reasonably priced shower heads. Wael said that the big problem was with scale build up in buildings. To aggravate the problem the pipes are sealed in cement in the walls. It was expensive and difficult to make repairs. He had a project on his desk where an entire building was having the piping replaced. The plan is to run rigid copper pipes through the inside of the building.

We asked him if he would buy a showerhead made in Jordan and he went off on the fact that there are no standards. He described the headaches he had from the 40 different toilet seats that he had to stock. Despite a huge inventory, someone always came in with a style that was not available. We discussed making a universal seat. Something to ponder while on the seat.

He thought the Jordan manufacturers were cheaters and scoffed at the thought that they could make a good product. He described some horror stories he had with Jordanian PVC pipe. He said it was bad quality and there was a complete lack of customer service. He told of a situation where he had a problem with a couple of fittings he bought from an Italian manufacturer and how not only did they replace the missing fittings but duplicated his entire order for no additional charge. Now that was customer service. He thought that was the general consensus in Jordan that the manufacturers made shoddy merchandise and did not back it up. This was a sentiment that we heard again and again during our visit.

Tuesday September 16

Meeting #1

We Met with Dr. Ahmad A. Al-Qaisia University of Jordan and Tarek Tarawneh of the IdRC. Tarek is a PE, Phd who attended University of Nebraska in the US. They developed a "water audit tool" to do water audits for large consumers. They measure actual flow rates and compare to international standards. They are only working with faucets. Toilets were not being considered.

In general large consumers have little knowledge of WSD's. They use restrictors instead of aerators. Previous standards in Jordan call for minimum flow rates instead of maximum.

They had 256 subscriptions with the criteria that they used 500 cubic meters per billing cycle. Their goal was to convince 60% of the buildings to initiate water conservation measures. At the time of our meeting they claimed that they had 57.6% on board.

They used the University of Jordan as an example of a recent retro-fit. They retrofitted the showers (?) – maybe some mistaken notes as they said earlier in the meeting that they did not consider showers -and found that there was a 40% savings after the completion of the work.

They identified problems with bureaucracy when they tried to get customers to implement water conservation efforts. Senior officials recognized the value in initiating a retro-fit but the junior employees hesitated and did not respond.

Tarek also indicated that the contractors who performed the work varied in ability to perform the necessary repairs. One contractor did a great job and actually installed different WSD's depending on the floor they were working on. Other contractors threw in whatever they could find. There was a bid difference in the amount of the savings between contractors. Again 'Standards' rears its ugly head.

When asked about a product that he would like to see he said he would like to see a product to make it easier to retrofit an unthreaded faucet. There is a big problem with unthreaded faucets. He said that 90% of public buildings use unthreaded faucets and most Mosques' use unthreaded faucets.

He confirmed that people were using more than one meter to circumvent higher costs for high water use and that multiple meters for one customer made it harder to identify large users. The cost for an extra meter is 63 JD's. Perhaps there should be a very high cost for 2nd and 3rd meters for the same address.

New codes were being introduced and that there was a projection of a 28% savings of water by the year of 2020. Dr. Ahmad had a formula that they referred to as the "future production growth factor" which was: Future Production Growth x Future Water Consumption = Percentage of Water Conservation. That formula as written here is probably incorrect. We should contact Dr. Ahmad and review that point.

Tarek advised that the focus be on the wealthy and to concentrate on the private sector.

Meeting #2

The next meeting was at the Customs Office. Our contact (did not get business card) said that Sayegh Group has tax exempt status to import raw materials from anywhere. He did not explain, nor did we ask for the basis for tax exempt status. Sayegh group also gets exempt status for typical import and custom fees-port entry, harbor maintenance, customs examination fees, etc. He also mentioned that income tax locally is 15% and that 10 year exemptions were possible for joint ventures with the US. There was also a scale of lesser deductions if a full tax exempt status was not available. Sales tax for Jordan market is 13%. If the product is a WSD maybe they should consider a lower tax or no tax at all. We asked about a tax credit and he said that would be decided at the ministry of finance. We asked how individuals are taxed and did not get much of an answer.

They use the Harmonized Code for product classification. Exports to the U.S. are tax exempt. Customs duties and sales tax would be exempt on machines brought in and parts for 3 years with extensions easily granted. We asked about pre-clearing shipments to speed travel and he indicated that it is not done. Acaba is the only port of entry with some land routes through Tel Aviv (?). He indicated that there were delays due to the overburdening of the port because imports to Iraq are coming through Acaba. He said that delays were resulting in warehousing fees in some cases. Other typical delays are because of poor document control and accuracy of documents.

He was not very forthcoming about the problems at Acaba. When we met with Michael Sayegh the next week, he said he was spending $5,000,000 per month on warehousing fees because of processing delays in the port. We also read in the newspaper reports almost daily that spoke of the huge problems at the port.

Note of interest: We saw Abu-Raji's grandfather's picture commemorating his service to the Customs Ministry.

Meeting #3

We met with Reem Badram Chief Executive Office of the Jordan Investment Board. She described a full package of services for manufacturing. She reiterated some of the tax incentives. She described for the QIZ zones (Qualified Industrial Zones) to encourage investment in manufacturing in Jordan. Ms. Badram indicated that they would help with licenses and had a list of financiers but did not offer financing. She also spoke about the income tax formulas. We did not take lots of notes as she indicated that all of the information was included in the information that she gave us. She indicated that 40% of the GNP was from garment manufacturers.

Additional Note: While waiting for our meeting with Ms. Badram we were looking at a magazine in the reception area. There was an article about the Jordan River Foundation which protects the environment and champions women's rights and is supported and promoted by Queen Rania. We thought that WEPIA might be able to secure resources and promote water conservation with the Jordan River Foundation.

Meeting #4

Went to Khalifeh Industrial Co., and met with Abdalla F. Khalifeh, the Chairman, owner and man who started the company. His company makes valves: gate valves, ball valves, mixing valves and faucets. He has a factory in Bahrain and an iron foundry in Saudi Arabia. He was in the process of shutting down his Amman factory. Mr. Khalifeh had nothing but complaints. He said that the competition with imports was fierce. It was his opinion that the 40% import tax was routinely circumvented with fictitious invoices that falsely reported the value of the goods. It was his opinion that the customs officials were receiving kick backs to look the other way. He suggested that Jordanian government did not purchase products made in Jordan. He related a bad experience with a water valve contract from the Ministry of Water where it was put out for 30,000 pieces, he won the contract but they only ordered half because they wanted to be sure of his quality. The bid spec has an unusually high pressure requirement that his meter met. The competition supplied a valve that

failed at a very low pressure but was accepted just the same. He got a portion of the contract and no more. He was very interested in working together on anything. He was very nice and proud fellow who appeared to have worked very hard in his life.

Wednesday September 17

Meeting #1

MTF Industrial Group. We met with Salahah Abu Subaih who is the production manager. Omar Fathallah, the General Manager was not available.

They are a licensed assembly location for ABB meter of Germany. They have been out of business for 6 months, which I believe is common. The last order was for 65,000 meters for the Ministry of Water. When in operation they have 24 hour assembly with 3 shifts. They can produce, calibrate and pressure test 500 per shift for a total of 1500 per day. Biggest (only?) customer is the Ministry of Water with a small amount of business to other Middle East countries. Major competition was from France, England and Saudi Arabia. They had a very nice, simple operation that emphasized quality through testing.

Meeting #2

We met with Nabeel Ayyad the production manager for Sayegh Brothers for Engineering Industries Co. Sayegh Brothers bought the Amman Casting Company 1 ½ years ago. The Amman Casting Company was founded in 1984 and makes a line of moderately priced low tech faucets. They make the body component but import the handles, valves and stream breakers. They are very inexpensive but not very popular. They appeared to be low end and were not conservation oriented.

When asked about problems with faucets and plumbing in Jordan he said there is very hard water, no standards, .5 bar average household pressure, and fit was a problem (back to no standards). He said that their most popular model was the #110011 which sold for 7.5 JD and had a 7 year warranty. He said that Grohe competed and had the majority of the market with a product that cost more than double at 16 JD. He said that a higher end model from his company cost 17 JD but that Grohe was winning the market at 40 JD. When asked about standards he said that there was no U.L. Labs or CSA in Jordan. He did say that the most likely place to get testing and certification was the Royal Society. We toured the factory and found it to be modern, diversified, vertically integrated, well managed and well supported.

** There is a complete description of our tour and input later in this document in the section entitled: Ideas, Input and Suggestions shared with Mr. Nabeel Ayyad from the Sayegh Brothers for Engineering Industries Co. (SBEIC):

Meeting #3

We visited with Bassam Bitar & Brothers wholesaler/plumbing supply. We found an interesting meter for roof tanks that would show how much water is left in the tank from the kitchen. It cost 18 JD and is made by a Syrian company Shami.

We asked his opinion on Jordanian products. He said that customers avoided Jordanian made products. He had nothing good to say about Rumm water heaters. He said they were 30 JD cheaper but he preferred another manufacturer (fortunately and surprisingly another Jordanian company). He said that the Rumm unit had a bad element and that the welds leaked. He said that the warranty was less than other customers and that the customer service was awful.

Meeting #4

Al Jazeera wholesaler was an importer. We met with Nafez Zgheir the manager. His entire inventory was from China. He said that Jordanian manufacturing was suspect. He also said that customers were not requesting the "West Bank" specification, whatever that meant.

Meeting #5

Met another company that had some faucets in the window but the store was predominately paint and tile. He said that the Sayegh paint was less expensive, good quality and their customer service was exceptional.

Thursday September 18

Meeting #1

We met with the Jordan Industrial Estates Corporation. We first met Dr. Moshen Kloub who was head of Investment. He gave us a general overview and introduced Ahmad A. Halaiqah. Mr. Halaiqah gave a nice presentation regarding the QIZ's and the efforts that are being made in Jordan to promote industry.

The group is very professional and appears to really make a difference. They control 1.5 billion dollars a year. They have full autonomy to pass legislation that they see fit. They act as the governor of environmental concerns. They provide and promote public and private sector support services. They described 3 industrial zones (A.I.E.-QIZ, H.I.E. and the H.U.I.E.-QIZ) plus the port of Acaba (AI.I.E.-QIZ). Interestingly the Acaba (A.I.I.E.-QIZ) is privatized and managed by Parsons Brinckerhoff International which is an American Real Estate Management Company. The Acaba Industrial Zone had a 50 meter high water tower to deliver strong and steady water pressure throughout the complex.

Jordan Industrial Estates Corporation was more than happy to help determine costs for space, telephone, electricity, employees, and helps get all of the licenses necessary to start a business in one of the industrial zones. They also provided waste water treatment plants for the industrial zones.

They said that the average wage was 110 JD per month for a 6 day, 8 hour per day week. Benefits are discretionary. After a training period of 90 days a contract for help and social security registration are required. The wages in Acaba were slightly higher. They have had many successful joint ventures.

At the end of our visit we met with Amer Majali the C.E.O. of the Jordan Industrial Estates Corporation. He was very gracious and indicated his desire to help us in

any way that they could. He was aware of the water problems in Jordan and expressed interest in water conservation devices.

Sunday September 21

Meeting #1

We met with Dr. Ahmad A. Al-Qaisia and visited the University of Jordan. 10,000 students, all buildings roof top tanks, no filters, treatment or softeners. The average consumption was 20-25 cubic meters per day. The lecture building was 1 year old and did not have any water conservation measures. When asked about why there were no water conservation devices installed in the new construction they said that they did not think about it. Proper specifications and codes would possibly prevent new construction from being designed and built without addressing water conservation.

They had approximately 24 toilets, 24 lavatories, 1 cafeteria that had one shower and 2 sinks. We briefly measured the flow in a sink on the bottom floor and one on the third floor. The bottom floor flowed at 12 liters per minute and the third floor flowed at 10 liters per minute. The urinals did not flush well if at all. There was no irrigation system. The heating system was a closed loop hot water system and the computer lab had air conditioning that did not use water. As far as maintenance the building was still considered under warranty, although we saw a water cooler being repaired while we were there.

We proceeded to the woman's dorm. In general the maintenance was very poor. There were leaks everywhere. Some of the faucets had WSD's and some did not. All of the plumbing appeared to be external plumbing. The maintenance supervisor said that all of the plumbing was replaced after 10 years. There was a lot of obvious sediment and scale related problems. He said that the students complained all of the time about the sinks, showers and toilets. The upper floor had lower pressure and even worse performance than the bottom floor. The roof top tank was an enclosed, unlined cinder block and or cement tank. There were serious problems everywhere and very little resources and or concern about making the repairs. The place was a mess.

We asked how many workers were on the maintenance crew and were told that there was a large group that supported the entire university (vague answer). When we asked, in general, how much maintenance time was taken up with plumbing related issues on a given day, he said about 50%.

Monday September 22

Meeting #1

Today was the big day. We were to meet with Mr. Michael Sayegh the President of the Sayegh Group. We met Mr. Sayegh and his son in their office. I tried to describe my vision for the products to be made by the Sayegh Group for the Jordanian market. This was a very difficult meeting for me. Every time I started to try to make a point I was interrupted with a long conversation in Arabic. There was

very little translation. When I did speak I felt that there was not a complete understanding of what I was trying to convey. There were long conversations between Mr. Michael Sayegh and Mr. Abdus. Salam Kamal with no translation. Mr. Sayegh's son (I never received a business card from him), although a graduate of Ohio State, spoke some Arabic and virtually no English.

Mr. Michael Sayegh did express many of the sentiments that we had heard previously. He felt strongly that the government did not buy products made in Jordan. He thought that there was a big water problem in Jordan but felt that it would be difficult to get people to embrace conservation. He thought that the business of making and selling water conservation products in Jordan would be small at best and probably a money losing venture. He agreed to spend no more than 50,000 JD on the effort and later (according to Mr. Abdus. Salam Kamal) mentioned a figure closer to 100,000 JD. He did mention that he was interested in helping the people of Jordan and was willing to break even on a venture if it helped them.

In the course of our conversation Mr. Sayegh described investing millions upon millions of dollars in wide ranging products and equipment from a brass bar casting furnace, to light bulb factory, paints and even bottle caps. He recently bought a tool making facility for over 400,000 JD. He bought an automated line and printing press for the bottle cap project that totaled more than 3 million pounds. He also indicated that if the Jordanian Government did not come around (?) he would be moving all of his operations out of the country to Egypt within 3 years. He also mentioned investing millions of dollars in marketing studies and feasibility studies to support his business ventures. To the best of our knowledge he has not studied the sanitary ware/WSD market in Jordan.

At the end of the meeting it was decided that we would have another meeting with Mr. Sayegh's son and some engineers the following day.

Tuesday September 23

Meeting #1

We met with Nabeel Ayyad, Sam Kandah and Mr. Sayegh's son in their factory. The purpose of this meeting was to determine whether it was possible for the Sayegh Group to manufacture aerators and deliver them to the market for re-sale at a price that was reasonable/lower than what was on the market currently.

We attempted to rough out the cost of making an aerator. We started with determining the style of the outer shell as manufactured on a single spindle screw machine. We discussed buffing versus roller burnishing. Roller burnishing is a process whereby a station on the machine is dedicated to applying a tool to improve the finish of a screw machine part. The end result is an improved finish, not as good as polishing but close.

We talked about making the inner components which would require injection molded parts. Although Sayegh Group has the capability to make the molds they were not

inclined to consider making that part. They thought it would be best to import this component. In the course of our conversation they made some phone calls and determined that in fact they did have some injection molding equipment that might be employed in making the internal components. For the sake of conversation we decided to continue considering the internal components as either bought as a single component or outsourced, which ever was less expensive which would be a function of production volume.

Mr. Michael Purcell outlined what the costs were for him in the United States using multiple spindle screw machines and automatic bar feeders. He spent considerable time reviewing the pros and cons of using solid bar stock versus hollow. He described what they might expect to achieve in increased efficiency and improved capabilities if they were to invest in multiple spindle screw machines. We proceeded to outline the costs and our results are listed below.

Estimated costs for manufacturing and delivering a WSD to the market for sale to the end user

	Non Pressure Compensating Aerator, no polish	Pressure Compensating Aerator, no polish
Raw material aerator body	$ 0.08	$ 0.08
Machining cost	$ 0.06	$ 0.06
Plating	$ 0.02	$ 0.02
Roller Burnishing	$ -	$ -
Aerator insert, non pressure compensating	$ 0.17	
Aerator insert, press. compensating		$ 0.30
Washers	$ 0.02	$ 0.03
Retail packaging	$ 0.05	$ 0.05
Labor to pack, ship	$ 0.03	$ 0.05
Freight	$ 0.03	$ 0.07
Cost	$ 0.46	$ 0.66
Mark up 50% to retail wholesaler/retailer	$ 0.92	$ 1.32
Mark up 20% to consumer	$ 1.16	$ 1.66
End cost converted to JD (cost x .70)	$ 0.81	$ 1.16

The above are estimated costs and represent the results of our conservation with the representatives from the Sayegh Group. This costing did not appear to include overhead factors for indirect support or sales commissions. Although agreed to in our meeting as representative of prices for sale to the end user, this formula was not approved by any retailers or reviewed by anyone in the Sayegh Group who is responsible for determining selling prices as far as we know.

This pricing is based on a two tiered distribution network that supports sales to the end user. In the US there is often another margin that is applied when sales are to the end user. The above prices would be what we would refer to as the "trade" or "contractor" price. In the United States certain large retailers geared towards the Do It Yourself trade routinely remove this margin and offer "trade" prices direct to the consumer. In the United States other types of stores such as Hardware Stores where these products might be found would apply an additional 25% – 50% margin.

This meeting appeared to indicate that in fact Sayegh Group can manufacture WSD's in Jordan and deliver them to the end user at prices that are competitive/lower than products currently offered for sale. * Although our calculations showed a lower retail price, the "cost" for an aerator appeared to be more than what it would cost to import the same item. The difference could be taxes and duties.

Wednesday September 24

Meeting #1

We met with Nabeel Ayyad and Sam Kandah in the WEPIA office in Amman to further discuss manufacturing WSD's in Jordan. The discussion came around to why they would manufacture a product when they could import it for the same cost or less. We also spoke about how Michael Purcell and William Wales could participate and generate revenue going forward.

After much discussion it became clear that the best avenue would be, for the meantime, to develop a product line manufactured outside of Jordan and sold to the Sayegh Group by New Resources Group, Inc. This line would include aerators, shower heads and accessory products designed for use in Jordan. There would also be a proposal developed for consulting to the Sayegh Group for manufacturing and marketing services.

This was a very productive meeting. Previous meetings were overshadowed with some issues very important to manufacturing, mainly, how many of a particular item are we attempting to commit to. ***With no history or projection or order it is very difficult to design a scheme to cost and manufacture an item***. When the discussion turned to "you provide it and we will sell it" there was a lot of relief on both sides.

New Resources Group, Inc., has a complete line of products available to save water. After our visit to Jordan we can see the considerable issues with regards to saving water with WSD's that will deliver great performance and be available at a reasonable cost to the end user. Our experience here will allow us to make the appropriate design changes to our product line.

Thursday September 25

Meeting #1

We gave a presentation to the Chamber of Industry and the Sanitary Ware Manufacturer guests on the subject of marketing water saving devices in the United States. We described the different avenues of going to market in the U.S. and described the types of stores and described the different players. Andawes and Mr. Abdus. Salam Kamal should have a report of the presentation. Our goal was to help guide the manufacturers in how to present their products to market in the U.S. We did not speak very specifically about WSD's specifically until later in the presentation.

Meeting #2

The next meeting was with the Jordan Forum for Business with Professional Women. We met with Bashar Al Ali the project manager and a team of sales women. They described an organization that combined the education for woman's preachers with a women's sales force for WSD's. The focus was on the women's sales force for WSD's. They conduct home water audits and sell WSD's in a kind of "Tupperware Party" concept.

The top sales person was a Ms. Khawia and she managed to make about 800 JD in 15 months. The sales women were interested in making more money. When we asked about how much they would like to make we did not get an answer.

We spoke about adding products to the line in order to make more money for the sales people. Initially we suggested that the products offered be anything that could help a woman in the home with a focus on hard to find products. There was a concern about departing from the water saver concept because if everyone started to sell non-water savers it would run afoul of the charter that the group has with WEPIA.

We brainstormed and came up with some ideas for new products to consider:

Float switch
Cleaning wand
Replacement elements for water heaters
Thermometer
Economical spare tank/additional capacity
Hand clothes washing device
Toilet tank water savers – dams, replacement mechanism
Fill cycle diverter
Dual flush mechanism
Bag for intimate apparel and delicate washables
Sun shower portable shower
Water filters
Waterless car wash supplies
Waterless cleaning supplies
Buckets- multiple sizes

Battery operated toothbrushes
Shower timer
Joint Venture with Sayegh Group to sell water heaters or appliances

The sales women spoke of logistical problems with their business. When the women go to the WSD Parties they have to bring everything they plan to sell with them. If they sell an item which they do not have in stock they have to get the item and take a cab at great expense to deliver it. The expense of the cab ride effectively negates the profit of that sale.

The fact that the sales women have to bring what they plan to sell will be significantly worse if the product line is expanded. They need to come up with a way to solve this problem. Maybe WEPIA can make one of their trucks available once a week for deliveries. Maybe the women can form a network so that women can pick up items that need to be delivered at the office (or Mosque) and deliver them to locations that are near their homes. Maybe they can deliver items to customers at the Mosque. Perhaps they need to add 1JD to the orders for shipping and handling for orders that can not be filled at the party or for "mail orders" from a catalog. Another thought is to have Lima deliver the WSD orders.

The potential difficulty in filling orders is a big problem and will hamper their sales efforts if it is not addressed with a viable, economical solution.

In general we liked the ladies very much. They seemed motivated and interested in the new ideas. They are entrepreneurs.

Ideas, Input and Suggestions shared with Mr. Nabeel Ayyad from the Sayegh Brothers for Engineering Industries Co. (SBEIC):

Mr. Nabeel Ayyad, Production Manager for SBEIC, Aman Casting Co. Ltd.,
Is a very knowledgeable, experienced, and committed production manager who was diverse and well honed in all facets of working with metal. Nabeel carried a sense of enthusiasm in his responsibilities and is well organized, interacted well with his staff and demonstrated good people skills.

Nabeel was quick to ask questions and respond with the necessary info when asked. Nabeel also appeared to be all "ears" on the feedback he was receiving.

The following is a partial list of ideas and suggestions shared with Nabeel and his staff during our tour of his facility.

The Sayegh shop was very modern and was close to being totally vertically integrated. There are Pros and Cons with vertical integration which was discussed with Nabeel and he agreed with the thoughts.

When attempting to think through various strategies for manufacturing it is important to know what the anticipated volume of the part you expect to produce. Unfortunately, Nabeel didn't have any idea what the anticipated volume was for what

he was currently making let alone a projected volume. He explained the Sayegh Group had just recently bought Aman Casting and they were still in the midst of developing marketing strategy.

We spoke of market perceptions (Jordanian Made vs. Imports), any strengths and benefits of being produced in Jordan and any weaknesses. We also discussed, though it was putting the cart before the horse, cross merchandising techniques for WSD's and faucets.

Our conversation turned to design capability and Nabeel indicated the difficulty in getting designs from concept to prototypes. We asked if they had ever used a process called STEREO LITHOGRAPHY. Nabeel indicated they had never heard of it. We went on to explain what Stereo Lithography was and Nabeel seemed to fully understand the purpose of the equipment. We discussed if equipment capital was available and Nabeel indicated that was never a problem. We explored if Sayegh had the necessary support for Stereol Lithography, which they did. Nabeel and the CAD/CAM design staff that we met and discussed Stereo Lithography with were excited. They asked if we could supply more information, which we did in both English and Arabic. We also suggested that they check with technical schools to see of they had the Stereo Lithography equipment or as a place to sell machine time to offset the expense of equipment.

Our attention turned to the factory and the vast assortment of equipment Nabeel had available. We started with their metal turning operation that was solely utilizing single spindle machines. Single spindle machines are easy to set-up and operate but offer not much more than this. They are very slow in cycle times vs. multi-spindle machines (typically 70-85% slower), and offer no flexibility or ability to be creative. For simple low volume parts, single spindle machines are a good candidate to run a job on. We looked at a part Sayegh was running during our visit. It was being run on a single spindle machine and had a need for a secondary operation. We indicated to Nabeel that if the part was being run on a multi spindle, the secondary operation would be done on the machine and cycle time would drop from 45 seconds a piece to approximately 9-10 seconds a piece. We also shared with Nabeel that it could be possible to run the part "Siamese" or another words to make 2 parts simultaneously.

Our conversation then turned to the type of bar stock Sayegh Group used for their turning operations. They used what is known as "hollow" stock, or another words brass bar that is not solid but is more like pipe or a tube. The reason they used hollow stock is because of the lack of what a single spindle machine has to offer. They do not have enough positions available to "hog/bore" material if the job requires it. Multi spindle machines this would not be an issue. American screw machine shows stay away from hollows. Typically hollows are not as true in diameter as solids and cause severe unnecessary wear on tools and the machines themselves. Also, hollow stock is significantly more expensive than solid stock. Nabeel agreed with my assessment with exception to the cost of the brass stock. While he did indicate the hollow stock was approximately 17 % more expensive, the savings were there because hollow stock produced less scrap. We suggested that

Sayegh negotiate a “buy-back” formula with a mill. All mills need to source and secure scrap since brass rod traditionally is over 90% produced from recycled brass and mills are more comfortable in knowing the scrap is from their own production and not from a source where contamination or bad elements might come into play. The buy-back would greatly reduce the cost of the brass bar. We also told Nabeel of some other markets he might want to look into to buy brass at a better price. Poland is a country where the quality is good and the price attractive. Nabeel then communicated the reason for hollows has a lot to do with the limitations of single spindle machines and that shortly, they were going to be casting there own brass rods in house.

We walked over to another area of the shop where Sayegh was converting/modifying casting equipment to cast their own brass rods in house. We were impressed with this major undertaking but confused and concerned about whether or not they had thought about all variables. To cast in house, they would need to source and/or generate as much scrap as possible. If Sayegh produces hollow stock and utilizes hollow stock we believe they will run into issues down the road with not having enough scrap to support there casting operation. Other problems could be stock that is not true or perfectly round, and not being competitive on cost against buying rod on the open market. We shared these thoughts with Nabeel, but he believed that their production would be O.K.

We then looked at some of their secondary equipment and transfer machines. They are using a machine made in Italy by a company called Buufi. Buufli’s are world-renowned and a great machine for complex type of machining and back work. In a casting operation, it is imperative that equipment like this is available. However, a job that I observed running on a Buufli could easily and more effectively and less expensively be done with a simple jig set up on a bench. We discussed this idea with Nabeel and he basically indicated they were building stock on that part and it was “make work” for that day.

We then reviewed his casting equipment, which was not running while we were there. There appeared to be a need for part ejectors, as we saw no sign of the necessary attachments required for them to be on the machine. Again, with no idea of volume requirements, it might not be necessary to have ejectors, though typically casting is a slower cycle time and fairly labor intensive and part ejectors lend to a more efficient and safe operation.

Nabeel’s concern turned to his dies, some of which seemed in need of repair. He indicated maintenance was lacking and currently slow and lengthy in time it took for repairs or to make new dies. We shared with him the idea of outsourcing these requirements to China or logistically closer, to Portugal. Nabeel indicated they had used Italy in the past to make dies. It would not be surprise us if Italy just farmed the jobs out to Portugal. Portugal is where many molds and dies are made. The quality is outstanding and cost is very reasonable.

We then reviewed their prep and polishing departments. We were impressed with the modern equipment they had and the quality of the work they were performing.

The buffing and polishing department was one of the cleanest operations we have ever seen. The cleanliness of the department was strange because it appeared they were not using the most modern buffs (buffing pads) or compounds available.

They use a stone media with vibratory bowls to remove rough imperfections in their preparation for the buffing operation. We suggested that they try a steel ball media as opposed to the stones they were using. In vibratory automated bowls the steel balls create a smoother surface and last longer. We shared with Nabeel the name of a great compound for brass known as a jewelers rouge and indicated that if he needed help getting some samples, we would be more than glad to help. As we were leaving the buffing department we saw their collection equipment and canisters in the middle of the production floor. We told Nabeel the importance of enclosing the collection system. A simple enclosure will increase the systems CFM air flow by 30%. Nabeel asked how it can be enclosed, and I told him basically just build a box around it with some plywood and put a door on it so you have access to clean the canisters.

Nabeel then showed us a couple of the components that they outsourced for their faucet requirements. One of those components was the handle for the faucets. This seemed odd to us because they had their ability to cast. With their desire to be vertically integrated and existing capabilities for casting, one would think that they would make these parts. As we talked he said the problem they had with the parts was out-gassing of the parts in the plating operation. We shared with Nabeel that they might want to consider making the handles from a powder metal process or pressure sintering. Nabeel asked for more information on this process which we supplied in both English and Arabic. We also discussed the faucet cartridge and valve seats, which currently, Sayegh group is making from brass. In today's market, only the very cheapest faucets have a brass cartridge. Most faucet manufacturers use ceramic discs, as the longevity and performance is superior vs. brass and the cost is about the same. Also, Monel metal faucet seats are a new trend to reduce wear and leaks beginning in the faucet seat area. Nabeel asked for more info on these two subjects, which we supplied him.

The last area we toured was there plating department. They had an automated overhead rack line with all the necessary baths and wash tanks. Their plating operation is modern, safe, and appeared to be in compliance to what are vigorous and tough environmental standards in the States. According to Nabeel, they use both types of decorative chrome electroplating solutions, Hexavalent and Trivalent. We asked Nabeel if they ever had trouble plating parts and he indicated they do. One problem was out-gassing of zinc die cast parts, which was mentioned earlier. The out-gassing needs to be solved during the casting operation. Better control of temperature range during casting operation will reduce the out-gassing during the plating operation. The other problem Nabeel indicated was plating coverage of parts with angles or crevices, much like a faucet. We showed him some tricks in how to rack the parts better to "steal" chrome from easily deposited areas and apply the chrome to more difficult areas. We also explained to him how to use "thieves" which are electrodes and/or extenders that will throw the chrome solution in tight areas during the bonding step of plating. We shared with Nabeel other plating techniques

that could either lower costs and maintain acceptable quality like, as example, barrel plating or add to cost but greatly improve quality, as example, Physical Vapor Deposition. Nabeel asked for more information, which was supplied to him.

We gave Nabeel information and a directory, in English and Arabic, on how to and where to source used equipment that might be beneficial for his production operation. In addition, information on quality control and the six-sigma philosophy, and the ten rules for a Kaizan type of format for a manufacturing operation was offered to him.

In conclusion, the Sayegh Group (SBEIC) is fully capable of producing WSD's at their modern facility. They have all the necessary ingredients and talent for the recipe.

Summary Evaluation:

1. Sayegh Group is fully capable of manufacturing a wide range of WSD's at a competitive price for sale in Jordan.
2. At this time the Sayegh Group is not motivated to manufacture WSD's in Jordan. They would rather import the products. They believe that the WSD's can be imported at a lower cost they could make them for.
3. The perception of Jordanian manufacturing by retailers, the government and probably the general public is poor at best. To stamp a product with "made in Jordan" would lower the expectation for the product, the perceived value and the cost that could be charged.
4. The government does not appear to support local manufacturing as much as they could.
5. The lack of standards and codes for WSD's and sanitary ware is a huge problem that can not be overstated. The lack of standards is the common thread which starts at manufacturing, weaves through retail and contractor sales and installations, effects perceptions, effects performance for both customer satisfaction as well as conservation and leads to dissatisfaction by the end user and a negative attitude towards conservation, water systems and plumbing in general.
6. There is no "pull" on the retail side with customers asking for WSD's.
7. The poor performance of water systems due to sediment and scale has Jordanians very apathetic about plumbing and water in general. It remains to be seen how well WSD's, with the promise of saving water, saving money and delivering the same or better performance can be sold to people who are accustomed to having very poor performance and systems that routinely run out of water and fail.
8. The existing fixtures in Jordan are made to European standards and are for European water systems. Some function better than others but none are really designed for Jordan. Much of the poor performance and resulting apathy are created by fixtures that are not designed for use in the water environment that exists in Jordan.

Recommendations:

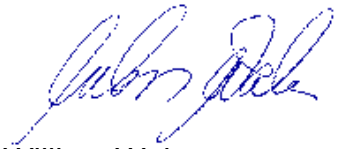
1. There will be no “magic pill” that will solve all of the issues with water fixtures in Jordan. The solution will be achieved by enforced codes and standards, products designed for the market and regular maintenance by the end users.
2. Establish codes and standards and a vehicle to enforce compliance.
3. Standards and codes should be developed by an independent organization such as ASME (American Society for Mechanical Engineers) and ANSI (American National Standards Institute).
4. Consult with manufacturers when making the codes. A group such as the PMI (Plumbing Manufacturers Institute) can represent the interests of manufacturers and try to influence standards to reflect design features that the factories are in favor of. The manufacturers must be on board if the new codes will be effective. Even a compromised code, if designed properly, will deliver some water savings. The exercise is to get everyone to agree with the notion of a standard and the vehicle to enforce compliance. Codes can be updated in the future once the vehicle is in place.
5. Codes should include marking on the products so that consumers can know what they are buying and distinguish between products that are WSD’s and those that are not.
6. Codes should include the requirement that, particularly for safety, product designs and performance be monitored by an independent third party such as U.L. Labs in the US and CSA in Canada.
7. The government should encourage Jordanian manufacturing by giving a “made in Jordan” allowance off of a bid price. In the U.S. such allowances exist and usually are valued at about 10%. Bids for products made in Jordan are automatically discounted by 10% so that an item bid for $1.00 is evaluated as $.90 when compared to the competition. Needless to say, a standard for what “made in Jordan” means needs to be established.
8. Manufacturers in Jordan need to support each other to fight the poor perception that Jordanians hold for products made in Jordan. Again, standards and holding to them is one of the first steps.
9. The Jordan Chamber of Industry should be employed to help change the poor perception that Jordanians hold for products made in Jordan.
10. Establish the market for WSD’s in Jordan with products made outside of Jordan but designed for Jordan. Once the products are established then local manufacturing can be considered.
11. Promote WSD’s to the people of Jordan. Advertise the new codes and get people to ask for items that have the necessary flow rates. Perhaps distribute flow gauge bags so that people can measure for themselves.

Next Step

1. New Resources Group, Inc. will create a line of WSD products for the Jordanian market. We will create products, packaging and some merchandising ideas.
2. These products will be presented to the Sayegh Group, Jordan Forum for Business & Professional Women and anyone else who might like to sell the products.

Thanks for the opportunity to see your country and evaluate the potential for WSD's. If you have any questions please feel free to call or e-mail. We will be in touch in the very near future.

Sincerely,
NEW RESOURCES GROUP, INC.



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